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ABSTRACT

In this booklet, one of a series intended to apply economic principles to major social and political issues of the day, it is proposed that speculation is often misunderstood, particularly in the operation of the futures markets. These are markets in which obligations to consummate sales and purchases at some time in the future are traded at a price specified today. Part 1 of the booklet offers a simplified analysis of some of the elementary economics of transactions involving time. Part 2 analyzes the nature of futures and options markets, and discusses the reasons for their existence, their evolution, and some of the basics involved in their operations. Part 3 is an account of the entities subject to futures and options trading, such as commodities, bonds, shares of corporations, and foreign exchange, and describes the most prominent features of the futures and options markets related to such entities. Finally, Part 4 discusses the social usefulness of futures markets, a few of the common criticisms, and the role of government regulation. (IS)

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Introduction

Few of the so-called "financial markets" — those covered in newspapers' business sections with long lists of quotations in very small and hard to read print — appear as mysterious and fascinating to the public at large as do futures and options markets. In large part the mystery is a result of jargon that is almost incomprehensible (puts, calls, short, margins, hedging, etc.); the fascination comes from tales of fortunes made and lost in a few days. Of late, awareness of such markets has increased. Because of deregulation and the rapid development of new forms of futures transactions, the general public is exposed to advertising concerning new opportunities for "aggressive investment" — all bearing the justified but mysterious warning that such high risk operations "are not for everybody."

This paper is neither a guide to detailed operations in futures markets nor a manual on how to make money in futures trading. It is, however, a discussion of the fundamental reasons for the existence of such markets, an explanation of the basic manner in which they function and, in particular, a study of their useful role in a free market economy.

Speculation, which fulfills an important function in how efficiently resources are used in a market economy, often has a negative connotation in the eyes of columnists, politicians and the public. The fact that speculation is at the heart of futures markets, combined with the vocabulary and other technicalities of such markets and the possibility of quick gains and losses, has traditionally geared public opinion toward the view of those markets as being little more than just sophisticated gambling among a few who take advantage and compound the effects of natural disasters, unexpected crop failures and other unanticipated changes. That lack of public understanding brings with it acceptance and even support for regulation and controls (and even outright prohibitions) that interfere with the normal functioning of those markets. Such interference cripples the market's ability to improve overall efficiency, and at the same time distracts attention from the actual source of some particular problems.

Futures markets are markets in which obligations to consummate sales and purchases at some time in the future are traded at a price specified today. Because the passage of time is the essence of futures trading, Part 1 of this study will offer a simplified analysis of some of the elementary economics of transactions involving time (called transactions "across time"). Those transactions across time are essentially the same, and perform similar useful functions, as operations across different locations. Part 1 will also provide the basics necessary to understand what futures trading is all about by starting with notions that are familiar to the reader. Part 2 will analyze the nature of futures and options markets, and discuss the reasons for their existence, their evolution, and

some of the nuts and bolts involved in their operations. Part 3 is an account of the entities subject to futures and options trading (commodities, bonds, shares of corporations, foreign exchange, etc.), and describes the most prominent features of the futures and options markets related to such entities. Finally, Part 4 discusses the social usefulness of futures markets, a few of the common criticisms, and the role of government regulation.

Part One
The Economics of Transactions Involving Time

Corn prices in Maine are not very different from corn prices in Iowa, except for transportation costs — quite a remarkable event, considering that corn doesn't grow in Maine. Regardless of location, corn prices are normally not very different in summer or in winter, except for the costs of storage. That, too, is remarkable considering that corn doesn't grow in the winter. These two occurrences, apparently very different, are the outcome of the same kind of actions by individuals in a market economy. The first is the result of someone transporting corn from Iowa to Maine; the second, the result of someone storing corn at harvest time and therefore "transporting" it from that time to a later dale. The motivations for individuals to take such actions and the effects of those actions are vital.

Transactions Between Locations

Consider the case of a commodity (corn) being produced at two different locations, initially with different local prices (in Iowa, where given the local supply and demand conditions the price of corn is initially, say, $2 per bushel, and Maine, where the initial local price is as high as, say, $15 per bushel reflecting the fact that it is not impossible but very expensive to grow corn in Maine). If transporting corn between Iowa and Maine were prohibited, those prices would persist and no further discussion would be necessary. But what if transportation was allowed, and the cost of that transportation was negligible or still more extremely, zero? Someone would find it profitable to purchase corn in Iowa at $2 per bushel and ship it to Maine where it can be sold at $15 per bushel — a brilliant deal. In fact, no one will be willing to sell their corn in Iowa at such low prices relative to what it can bring in Maine. But as more and more quantities are shipped out of the Iowa market and into the Maine market the price will tend to rise in Iowa and fall in Main. The opportunity for profits will persist for as long as the prices are different, and additional shipments will in turn make those prices less

different. The eventual outcome is a situation where prices have settled at the same level in both Iowa and Maine, a level somewhere between $2 and $15 — say, for example, $4, and where any price differential reflects only transportation costs between Iowa and Maine.

Note that the mechanism was triggered by individuals seeking profits, and that ultimately those profits vanished. Those individuals are, of course, "merchants" who take care of the trading and transportation from one place to another. And while they are ultimately making no profit (or, more precisely, no profit higher than they would get in any other riskless endeavor) they continue to operate, for if they stopped prices would again differ and new incentives for additional shipments would emerge. The activity of such merchants, although at times suspected and even victimized in the past, is today fairly well understood as an activity that adds value to commodities. Commodities trading is a respected occupation, and the public generally understands that corn in Maine is, in a fundamental sense, a different commodity than corn in Iowa, in the same manner that automobiles in Miami are different commodities than automobiles in Detroit.

In economic terms, what is the gain in efficiency that society as a whole reaps from such trading between places? Economists have a clear-cut way of measuring those gains. A simple account follows. As compared to the initial, no-trade situation of the corn example, the result of the trading activity is to raise the price of corn in Iowa, where it is very abundant, and to lower it in Maine, where it is initially very scarce. Each of these two movements gives appropriate signals to producers and consumers in both Iowa and Maine. In Iowa, the signal to consumers is to consume less of this commodity that is scarce in Maine; the signal to producers is to produce more. In Maine, where the price falls, the signal to consumers is to consume more because there is an abundance elsewhere that can be shared; the signal to producers in Maine is to produce less or none at all, because production — comparatively — is just too costly, and it is in the best overall public interest to use those resources for producing something else. In fact, the nature of these overall gains is well known and frequently cited as the fundamental reason for free trade among nations. These are called, not surprisingly, **the gains from trade**.

There are, of course, transportation costs, which include not only physical transportation costs but also such items as insurance and, in particular, the payment of whatever taxes are levied on trade (called tariffs in international trade). In this case, of course, the price of one unit will differ between the two locations by the total cost of transporting the unit. Trade across locations, then, tends to equalize prices (adjusted for transportation costs) and to increase economic well being.

Transactions "Between Dates"

To understand trade "between dates" or trade "across time" consider (as an unrelated but similar example) the simplest case of a given commodity (perhaps corn again) which is being produced and consumed at some relatively constant price ($4 per bushel) period after period. Suppose that at some point (today) it becomes suddenly known that in the future (tomorrow) a natural disaster will occur, making it much more costly to produce the commodity in question. In the corn example, a change in weather conditions might increase production costs so that, at every possible price, producers will be willing to produce only half of what would be produced under normal conditions.

Assume, first, that it is strictly forbidden for anyone to hold corn from one period to the next. In such a case, it is easy to see that nothing will happen today, even with such bad news about tomorrow, and that tomorrow, when the disaster comes, prices will rise considerably (perhaps, in the example, to $8 per bushel), in exactly the same manner as if nobody had anticipated the disaster. The outcome is exactly the same as in the example involving the Iowa and Maine geographical markets, when transportation from one to the other was prohibited. The market today and the market tomorrow are exactly the counterparts of the two geographically different markets, and the prohibition to carry inventories from today to tomorrow is equivalent to the prohibition to transport commodities from here to there. In both cases the outcome of such prohibition would be to isolate markets — across space in one case, across time in the other.

Now assume that the carrying over of corn inventories is allowed, and, as an extremely simplified case, that there is no cost whatsoever in holding those inventories. Knowing about the forthcoming disaster, and about its effects on the next price period, someone will find it profitable to purchase corn today at $4, keep it for one period and sell it tomorrow at $8 per bushel. In fact, few suppliers will be willing to sell today at $4 knowing that tomorrow the price will be $8. As a result, inventories will be held and shipped the next period. The effect of this movement of commodities across time is clear: prices will rise today as part of production is held as inventories and tomorrow's prices will be lower as inventories are brought in from the previous period (in the example, lower than $8 per bushel). Again, as before, in the absence of transportation costs (storage costs, in this case) prices in the two markets will end up being the same. The gains in efficiency are the same as in transportation between locations: signals to consumers and producers to consume less and produce more today because there is a forthcoming disaster. As a result, when the disaster comes less needs to be sacrificed in consumption, and less needs to be produced under adverse weather conditions. This corresponds exactly to trading between locations. In this case,

commodities are carried not from one location to another, but from one date to another, and the effects of doing so are the same in terms of price equalization and gains in overall efficiency.

What is necessary for this mechanism to be set in motion? As before, the activity of individuals seeking profits. Such individuals are called **speculators** whether they are at the same time consumers who fill their refrigerators until next period, producers who withhold sales and accumulate inventories, or others. In all cases, speculators desire to make a profit, and always the final, unintended result is that those profits (in this simple example in which everything is known with certainty) disappear. Speculation is then a productive activity, in the fundamental sense that it increases overall efficiency in the allocation of resources, both to consumption and to production.

Let's now be a bit more realistic. As with trade between locations, there are also "transport" costs in trade between dates. These are, first, the costs of paying for rental of physical space for storage, insurance, etc., which is exactly the equivalent of specific freight and insurance costs in the transportation between locations. Such cost can be visualized as a certain percentage (**"c"**) per period of the commodity stored going up in smoke or eaten by mice. If ice cream were the commodity in question, and ice cream would melt at a percentage rate of "c" per period, then one cost of holding x units of ice cream during one period would be given by x times c. This is not the only cost, though, or even the most important one. One of a different nature is given by the rate of interest. This is because the rate of interest measures the cost of tying up purchasing power for the time the commodity is held. If the speculator borrows the money to do so, at the end of the period he needs to pay back whatever he borrowed plus the same amount times the interest rate. If he used his own funds the same cost exists given the loss of the interest that he would have received by lending his funds at the going interest rate for that period rather than buying the commodity and keeping it for that length of time. This is what economists sometimes call **opportunity costs**.

If we call "i" the interest rate, $\mathbf{P_1}$ the price at first period, and, as before, "c" the costs of paying for storage, then the total cost of carrying one unit of the commodity from one period to the next will be

$$P_1 (i + c)$$

Using actual figures, if the price of corn in period 1 is \$4, the interest rate is 6 percent per period, and the cost of storage is given by a rate of physical depreciation of 9 percent per period, then such cost would be

$$P_1 (i + c) = 4 (.15) = 60 \text{ cents}$$

Under these simple, idealized conditions, for anyone willing to carry speculative inventories from period 1 to period 2, then, the price in period 2 needs to be **at least** equal to the price in period 1 plus those total "carrying costs," or

$$P_2 = P_1 + P_1 (i+c) = P_1 (1+i+c)$$

Or, in the numerical example,

$$\$4.60 = 4 (1+.15)$$

This last expression is an important one because it establishes a link between prices at two different periods in very much the same manner as trade between locations and transport costs established a connection between prices at different locations. This equation takes a slightly different form, as

$$P_1 = P_2/(1+i+c)$$

so that it can be interpreted as the link between the price expected to prevail tomorrow (P_2) and the price that is established today. If the price today is larger than the right-hand side of the last equation then no speculative inventories will be held; if it is smaller, no one will be willing to sell today, and if those expectations are held very firmly then the price today will need to rise until it becomes equal to the right-hand side. We will return later to this important connection between current and expected future prices.

Before proceeding, there are several additional elements to be considered. These elements do not change the fundamentals, but without them the connection between this discussion and the existence of forward prices and futures markets cannot be easily understood.

First, and most important, we have assumed a very simple world in which future events are known in advance and without a doubt. The fact that this is not true is one of the main reasons why transactions across time are not the exact equivalent of transactions across locations. The outcome of a transaction buying corn in Iowa and selling it in Maine is certain, except for the very brief time period taken by physical transportation, because prices in both Iowa and Maine are known. In transactions involving time, risk and uncertainty are always present, and even when expectations of a given future price are shared by everyone there always exists the possibility for individuals to be ultimately mistaken.

The second caveat is that in most industries there are inventories held for other than speculative purposes. This is fundamentally so because in most cases sales are not perfectly synchronized with production. There is then a pay-off to continuously hold inventories of finished

goods, and whatever the optimal level of these so-called working inventories is results from comparing such pay-offs with the costs of carrying them period after period.

Part 2
Forward Contracts, Futures Markets and Options

Forward Contracts

A **forward contract** is the commitment by the seller to deliver a certain quantity of a well-defined commodity at a future specified date, and at a price agreed upon in advance. That commitment is in turn matched by the buyer's commitment to accept delivery of the commodity in question and pay the specified price. In this definition the word commodity is used in a very generic sense. The commodity subject to the contract in question can be a physical one such as corn or livestock, or a financial asset such as a bond, a share of a particular corporation, or foreign exchange. The items that are the subject of forward contracts will be described later.

A forward contract is essentially different than a spot transaction (a purchase/sale taking place today) only because the actual consummation of the operation is postponed to the future. All conditions are specified today, and the only thing left for the future is the execution of the actual exchange.

Before entering into more detail, it is important to understand why such contracts exist at all. Their effect is to eliminate uncertainty about a price to be paid in the future. The mechanism of carrying inventories is not sufficient for two reasons, both of which have to do with the lack of perfect knowledge of the future and the fact that only rarely do all individuals hold the same expectations and with equal firmness.

The first of these two reasons concerns the obvious fact that there is an asymmetry in operations involving time. Physical inventories can be carried on from today to tomorrow, but not directly from tomorrow to today. Using the earlier corn example, suppose that the news today is that tomorrow, rather than a disaster, a change will take place (perhaps exceptionally good weather conditions) that will dramatically lower production costs. In such a case a lower price tomorrow will be expected. If any inventories are held over from yesterday, and if the new expectations are generalized, some of those inventories will be liquidated today and prices will fall. Tomorrow, when abundance arrives, prices will still fall but not as much as they would have in the absence of the announcement. In this case, exactly the same effects will follow as in the previous discussion of the forthcoming disaster (but, of course, in reverse).

Now suppose instead that such information about future events is available only to certain individuals (perhaps as the result of their having engaged in successful research about weather conditions). Is there any way for these individuals to directly purchase tomorrow's corn in order to sell it today, in the same manner in which, in the case of the disaster, they could have purchased today's corn in order to sell it tomorrow? Not if only spot markets exist. If they hold inventories today they could accomplish it by liquidating those inventories, therefore triggering the beginning of the adjustment process. But if they do not, or hold very few of those inventories, the adjustment will not take place. In other words, the opportunity for making profits (or avoiding losses) is not open to everyone and individuals possessing superior information may have no way (or find it very difficult) to gain from their knowledge. The problem with such a situation is that a lack of prospective gains means no incentives for engaging in an activity that has a positive social value — forecasting the future.

At this point the important thing to notice is that, in this example, individuals possessing superior information will have an incentive to sell forward contracts. This is one reason why such contracts came into existence. Assume, as in the numerical example, that the spot price of corn today is $4 per bushel and that total carrying costs are zero. In that case, individuals will be prepared to promise delivery of corn during the next period at a price higher than what they expect the spot price to be at that time. If initially they expect, for example, that the price tomorrow will fall to $3 due to the weather change then any commitment to deliver corn at a price above $3 (which of course assumes the obligation of someone else to accept delivery at that price) means a profit if their expectations turn out to be correct. This occurs simply by buying corn during the next period at $3 and delivering it at the guaranteed higher price. But if those forward contracts exist, today's inventory holders will find it profitable to liquidate them at the current price of $4 and make an agreement to have the same commodity delivered tomorrow at any price lower than $4 rather than holding those inventories. If no speculative inventories are being held today, some working inventories will be liquidated. What will happen to the spot price today and to the forward price for delivery tomorrow as these operations go on? On one side, liquidation of current inventories will prompt a fall in today's spot price. The realization that fewer inventories will be available tomorrow induces expectations about tomorrow's prices causing upwards revisions by those possessing superior information (and who, presumably, compete among each other). The result, once again, is equalization of today's and tomorrow's spot prices, with the same overall gains in efficiency as in the case of the disaster. Those gains are made possible, in spite of the asymmetry aforementioned, by the

existence of forward contracts. Notice again that in this case the existence of such contracts was necessary because expectations about the future fall in price were not shared by everyone in the economy — in particular, not by those holding current inventories.

The second reason for the existence of forward contracts also has to do with the lack of perfect foresight and with different expectations held by different individuals. Consider the case of a firm acting as an intermediary between producers and consumers in an activity requiring large working inventories (perhaps the hardware store around the corner). Continuous holding of those inventories provides automatic insurance against a rise in the price of the commodity. Such a rise would, in fact, bring about a gain. There is no chance, however, for the firm to be insured against a fall in the price unless forward contracts are available. If expectations about a future price decrease were generalized and firmly held, the price today would already be lower and nothing could be done about it. If there is uncertainty and the firm wishes to be insured against the possibility of a price drop, it would then be prepared to sell a **forward contract** — a commitment to sell in the future at some price even lower than what the firm expects the price to be at that time. A premium is paid by the firm. Should the firm sell a contract for the inventory it holds then regardless of what happens to the spot price in the next period the only possible loss (or gain) is that premium. In every case, whatever losses or gains are made by holding the inventory are compensated by gains or losses made in the forward contract.

The demand for forward contracts and the reason for their spontaneous emergence in a market economy are then closely related to the demand for insurance. The motivations and effects on efficiency are the same as in the case of all other kinds of insurance. In the jargon of these specialized markets, insurance is called **hedging**, which the dictionary defines as "to try to avoid or lessen loss by making counterbalancing bets." In the example just discussed, the firm holding working inventories and selling a forward contract was hedging. The implicit bet chosen (or imposed by the nature of the activity) by holding inventory was that the price would go up; the counterbalancing hedging, through the sale of the forward contract, a bet that the price would go down.

This is just one technicality. There are others. The firm in the example, holding inventories, is said to have a **long exposed position**, and its sale of a commitment to deliver in the future at a specified price (the forward contract) is characterized as having taken a **short position**. Whoever bought that contract (and therefore took the obligation to accept delivery) is said to have taken a **long position**. To be short, then, is to have outstanding commitments to deliver; to be long, to have outstanding commitments to accept delivery.

In summary, there are fundamental reasons for forward contracts. Essentially, they are an evolution of the initial operation of holding inventories, and such inventory holding is always behind the relationship between the forward contract and the expected future spot price. Making allowances for a risk premium, the difference between forward prices and current spot prices cannot be larger or smaller than carrying costs. If it is larger, it will be lowered by individuals (called **arbitrageurs** in the jargon of the market) competing to offer future delivery at less than the forward price. If it is smaller, it will be raised by liquidation of current inventories. The existence of transaction costs, and the fact that different individuals and firms specialize in different functions, merely increases the attractiveness of forward contracts and the gains to be obtained by using them. Business firms that are strictly limited to their activity in the production process — and are thus willing to pay a premium for insurance — provide much of the basis for the very existence of forward contracts and become hedgers. Individuals watching the relationship between current and forward prices are specialized arbitrageurs. Those taking the risk of matching the wit of their forecasts against the expectations of the market implicit in forward prices are most properly called speculators.

The Emergence and Features of Futures Markets

As a matter of history, and in very much in the same way as the carrying of inventories preceded the existence of forward contracts, these in turn led to the existence of what is known today as **futures markets**, which are essentially nothing more than the institutionalization and highly organized centralization of markets for their exchange.

Initially, problems arose concerning both initial formalization and possible transferability of forward contracts. They were, by their very nature, private agreements tailored to the double coincidence of needs of both the buyer and the seller taking up the obligations to deliver and to accept delivery. The first problem was the exact specification of the commodity — a detailed account of quality, place, and mode of delivery. This is sometimes called **asset quality**. The difficulty was easiest to overcome in the case of assets for which quality was already under standards established by commercial practice such as grains or metals. Services to be delivered in the future with several quality attributes, for example, are difficult to specify in advance. The second problem was to establish the quality of the parties -- the assurance to each party that their counterpart was to honor the agreement without need for expensive or prohibitive legal battle.

These problems, of course, were not only an obstacle for the formulation and initial sale/purchase of the contract, but also for transferability by either party. Expressed in different terms, such contracts

were not very liquid — not easily sold quickly without a loss.

It was the need to resolve these problems, together with the increasing use of forward contacts, that gave birth to the organization of formal markets for their exchange — the futures markets. Of course, this centralization became possible only as transactions in forward contracts acquired a volume that would justify it. Certain economies of scale due to a large volume of operations needed to be present before such institutionalization was economically justified.

What are the features of these futures markets and how do such markets overcome the problems of forward contracts? Futures markets are, first, private exchanges at which only their members can trade, which subject their members to a great many requirements — including cash or bonds deposits — that guarantee the seriousness of the operations, and which are in turn subject to intense scrutiny by watchdog government agencies.

The first feature of these organized markets is that all futures contracts are highly standardized so that there is no question concerning asset quality. Of course, such standardization cannot cover all possible variations in type and quality if the volume of transactions is to be kept at important levels, so that hedgers' specific needs (as far as type or grade of a given commodity) may not be contemplated. This is compensated for by the much higher liquidity of the contract. This is not a major problem, since the price of assets of different types or grades normally changes in the same fashion — if the price of grade AA eggs goes up, so does the price of grade AAA eggs.

The second characteristic of futures markets is the authority of the exchange over disputes and the establishment of a central clearinghouse that stands between the buyer and the seller — and then only through their brokers, the members of the exchange. The existence of the clearinghouse and the imposition of strict requirements on the part of exchange members almost eliminates the problem of doubts about the ability and/or the willingness of the parties to fulfill their contractual obligations. This is achieved by requirement of cash margins — another example of the market jargon. **Margins** are percentages of the total value involved in a particular operation that are required as deposits by both parties at the time the operation takes place. These margins are updated daily during the life of the contract.

Suppose a firm holding a large inventory of corn wants to take a short position — to sell a futures contract therefore assuming an obligation to deliver a certain quantity of corn at a future date, perhaps 90 days. If the futures price is $5 per bushel, and if the firm buys futures totaling 50,000 bushels, the operation then has a total value of $250,000. Suppose the margin requirement is 10 percent; when selling such contracts the firm is then required to deposit $25,000 with the clearing-

house — always through its broker. If, two weeks later, the futures price for the maturity date of the contract has risen to $5.20 the total value of the operation has gone up to $260,000. In this case the firm is required to increase its margin deposit by $1,000 — to $26,000 — while its counterpart (the purchaser of the futures contract, committed to accept delivery of the commodity) will have its margin requirement diminished to less than its original amount.

Why is this so, and in what sense does it guarantee the fulfillment of both obligations? In the case of the firm selling the futures contract, how can a $260,000 financial obligation be met with a margin deposit of only $26,000? Suppose that, indeed, at the maturity of the contract (90 days after its initiation) the spot price is $5.20. In this case, the firm can always buy corn in the spot market (paying a total of $260,000), while simultaneously fulfilling its delivery obligations and receiving $250,000 — at a $10,000 loss. That loss is more than sufficiently covered by the margin deposit of $26,000. In fact, the firm will have all the incentives to proceed rather than refuse and lose its deposit. If it does so (refuses), the clearinghouse can perform the transaction and fulfill the delivery obligation, at a loss of $10,000 which is again more than covered by the margin deposit. Indeed, even a smaller percentage margin would accomplish the same thing, provided that it is continuously updated as is required by the exchange. If at some point the seller or buyer is not prepared to risk further losses (if it is losing, as is the example firm) or wishes to take gains (similar to the counterpart of that firm) then it can finish the operation by selling its contract. Of course, the possibility of buying and selling in the spot market at the time the contract matures means than in most cases — but not always — the actual, physical delivery of the commodity or asset will not take place, with brokers and clearinghouses simply liquidating the differences.

There is an additional point concerning the deposit of margins. This refers to the considerable leverage made possible by them and, with it, the potential for gains or losses which can be very large in proportion to the initial cash requirement. In the example, the firm selling the futures contract lost $10,000 on an initial investment of $26,000, while the buyer of the futures made $10,000 on the same initial investment — a return of over 38 percent in 90 days with a rise in the spot price of the product of only 4 percent! Further examination indicates that the result would have been similar had the futures contract purchaser bought the commodity instead by borrowing and using the commodity itself as collateral. Note that in this example it is assumed that carrying costs were negligible, so that some adjustments would need to be introduced into the numbers to make the example more realistic. But this does not invalidate the main point.

There is a final feature of centralized and highly organized futures markets that needs to be mentioned — the advantage of having transparency of the forward prices implicit in future contracts. In these markets, whatever the price of futures is today is determined by auction, which is a long way from the seeking — by buyer and seller — of the lowest and the highest forward price they can fetch in a fragmented market. Additionally, this is particularly important for another overall benefit which will be discussed later, namely the role of futures prices as the objective revelation of the market's expectations about the future course of spot prices. The more competitively those futures prices are established (that is, the more they reflect overall supply and demand conditions by a large number of individuals), the better their efficiency as indicators of general market expectations.

Options and Options Markets

There is still need to describe another twist in futures markets — a rather popular one that sometimes brings the greatest bewilderment to the uninitiated: options markets. An option is a choice to take something or leave it. In futures markets, an **option** is the right to buy or sell (and the corresponding obligation to sell or buy) a certain commodity at either a specific date or at any time during a given period. In the jargon of the market, an option to buy is a **call**, and an option to sell is a **put**, and sometimes those who sell them are called "put writers" or "call writers" or simply "options writers". The specific price at which the operation is to be consummated if the option is exercised is called the **striking price**.

Note that an option is essentially a one-sided futures contract. As such, its usefulness is that it allows hedgers to be insured against either a rise or a fall in a price while still keeping open the possibility of gains if prices move in the opposite direction. Consider again the case of a firm holding a large working inventory (a long exposed position) and wishing to insure against a fall in price. To do so by selling a futures contract would eliminate not only a possible loss from a fall in the price but also any gain from a possible price increase. If, instead, the firm purchased a put option (that is, the option to sell at some given striking price); if the price falls the firm can exercise the option — or sell it — and the gain in doing so would, as with the futures contract, compensate for the loss in the value of the inventories. But if the price rises, the firm would not exercise its option and could, therefore, still benefit from the increase in the value of its inventories.

Which strategy is preferable? The answer can be quite complicated. It depends on the structure of the firm's expectations, its attitudes toward risks, and the premiums embedded in both the futures contract

and the options. In general, premiums in futures contracts are smaller than option premiums, but the possibility of benefiting from a price change in the direction opposite to the movement the hedger is insuring against is also lost. Obviously, if the firm attaches an extremely low probability to such movement, futures will appear more attractive if the premium is lower.

As in the case of futures, organized markets for options followed the development of private options contracts and grew along similar lines. In the United States one of the most traditionally established options markets is the market on equities (shares of corporations). Until 1973 such options were traded in the over-the-counter market and, similar to forward contracts, were very much tailored to individual needs, therefore carrying the same problems of risk of default and lack of liquidity. The Chicago Board of Options and the Options Clearing Corporation (its clearinghouse) were established in 1973 as a centralized, highly organized market.

Part 3
Some Futures Markets and Their Underlying Assets

Without entering into particulars (the references at the end are a better source of details than could be provided in this essay) it is necessary to deal with the most important futures markets and their **underlying assets** — the things promised to be delivered and accepted in the future, such as corn in the previous examples. In all cases futures markets represent, in one form or another, the highly organized centralization where forward contracts (futures) are traded. The only difference among these markets is the underlying asset to be delivered and accepted, and different modes of operation are chiefly a reflection of the characteristics of the asset in question.

In principle, anything could be the object of forward contracting and futures trading. Physical characteristics are important, however, in determining cases in which standardization can go far enough in order to generate a sufficiently large volume of operations. The emergence of today's most important markets reflects, to a large extent, these characteristics.

Commodities Futures

In our analysis we have used the example of a commodity (corn) because commodity futures are the most traditional and common futures markets — and the easiest to understand. There is little to add, then, concerning asset characteristics and the motivations for futures trading.

Futures are traded for a large variety of commodities, from grains and other agricultural products to metals. Gold, in part because of its

traditional role in settling transactions in the days of the gold standard, has always occupied a special place, although it is physically just one more commodity. In the U.S., commodities futures are traded in eleven exchanges. The most important are the Chicago Board of Trade, the Chicago Mercantile Exchange, and the New York Commodity Exchange (COMEX). Since 1974, supervision has been in the hands of the Commodity Futures Trading Commission. According to the act of its creation, this commission is in charge of supervising futures trading in all commodities, "except onions" (see page 19).

Stocks and "Stock Indexes"

Stocks or shares of corporations are assets that entitle the holder to share in the corporation profits. Their value, therefore, is directly related to the current and future stream of profits of the corporation. Stock is traded in several spot markets. In the United States, the New York Stock Exchange is the most prominent.

Futures in stock, and in particular options, have been traded for some time in the U.S. Until 1973, options were exchanged in what were called over the counter markets, in which brokers tried to match buyers and sellers. In that year the Chicago Board Options Exchange began operations, and today there are four main exchanges, including the American Stock Exchange. These exchanges jointly own and operate their clearinghouse, the Options Clearing Corporation.

The introduction in 1982 of so-called **stock index options** is an innovation that has captured the attention of both financial experts and the common investor. A price index is a number that tries to reflect the prices of a group of assets or commodities. The Consumer Price Index, for example, tries to reflect the price of a selected group of commodities designed to typify the goods and services purchased by the average consumer. In the case of stock indexes, the index is built to reflect the price of a selected number of stocks. The Dow Jones Industrial Average is probably the best known and most popular; it is a weighted average of 30 industrial stocks with the weight or importance of each stock in the average being its market value. The Standard & Poor's 500 is likewise an index of a wider spectrum of 500 stocks. The underlying asset in a stock index future or option then is strictly a fiction — but a very useful one. The market value of this imaginary asset is, roughly, the market value of the group of different shares included in the index.

What is the difference between trading in particular stocks and trading in a stock index? First, stock index options never result in the physical transfer of any stock, as happens when the option in a particular stock is exercised. Only differences in value are settled. Second, and more important, whoever trades in a particular stock needs to forecast various conditions from the most general (how will the economy be

doing, how will energy or high tech industries be doing, etc.) to the more particular (the effect, for example, of the recent hiring or firing of a particular manager in a corporation). If there are enough indexes on which to trade, each covering more and more specific groups of corporations and sectors, individuals can tailor the index in which they will trade to their particular expertise (or lack of it) in trying to predict future events. Specialization in forecasting will, if anything, improve forecast quality and with it the creation of adequate signals for investment to be channeled into those sectors most likely to yield private and public benefits.

In 1982, within only a few months, three stock index options started trading: the Kansas City Board of Trade, the Chicago Mercantile Exchange (the most important one in terms of volume, followed by the Standard & Poor's 500 index) and the New York Futures Exchange.

If the general movement toward deregulation continues, future exchanges and refinements might follow. The government agency in charge of supervising and regulating these markets is the Securities and Exchange Commission, created in 1934 to oversee spot transactions and the stock market in general.

Interest Futures and Options

In these markets, the underlying assets for which futures and options are traded is a bond, using that term in a very general sense. A **bond** is an asset that entitles its holder to receive a payment (or a series of payments) at some time in the future. Such payments generally, but not always, consist of both the interest and repayment of the principal, both fixed in dollar terms. **Perpetuities** (called **consols** in Great Britain) represent a commitment to pay a fixed amount per period (the interest) forever, without ever repaying the principal. **Maturity** is the date at which the principal is to be paid back (one could call it the death of the bond). Perpetuities, then, have no maturity. In very general terms, to lend is to purchase a bond and to borrow is to sell one.

Because the payment of interest on a bond is fixed at the time of its creation, the market value of existing bonds rises when interest rates fall, and vice versa. This is because a fall in interest rates will make the fixed stream of payments of existing bonds more attractive when compared to the alternative of lending. People will, therefore, be prepared to pay more for existing bonds. Put another way, those who in the past purchased a bond (that is, lent at a given interest rate implicit in the stream of payments for that bond) make a gain over those who wish to lend today, when the interest rate is lower. Such capital gain is the rise in the market price of the existing bond.

Interest futures and options (as are the futures involving all sorts of bonds) are operations involving elaborate and often complicated calcula-

tions. The reason for such operations is the desire to hedge against future changes in the interest rate (i.e., in the price of bonds), and to try to profit from a presumably better forecasting of the expectations of the market. Strictly, in a world of perfect capital markets — with no costs of making transactions — there would be no need for interest futures. Hedging, as well as speculation concerning future variations, could in principle be done solely by combinations of purchases and sales of bonds of different maturities. Futures and options, in this case, simply substitute for lack of perfection in capital markets and by decreasing costs that could occur from too many simultaneous transactions.

What are the diverse underlying assets? We have used the term bond in a very general sense; technically, the term is reserved for assets of relatively long maturity (such as U.S. Treasury Bonds with maturities ranging between 10 and 30 years) which are only one among other underlying assets in these markets. Others are Treasury bills (a commitment by the U.S. Treasury to a single final payment for interest and principal at the end of three months, six months or one year), Treasury notes (from one to 10 years), and others such as Certificates of Deposit (traded by major banks in denominations of $1 million or more).

Interest rate futures and options boomed in the 1970s, when interest rates started to become much more volatile than before. Until 1975, forward contracts were traded, but in that year the Chicago Board of Trade started operations in standardized futures.

Foreign Exchange

An **exchange rate** is the price of one nation's money in terms of another's. Taking the U.S. dollar as a standard, the exchange rate is the dollar price of a British pound, a Japanese yen or a Mexican peso. These are very important magnitudes in terms of the level and rate at which they are expected to change, for the structure of trade and the lending/borrowing process (capital movements) among nations.

Until the 1960s, most of the Western world operated under a system of fixed exchange rates (the Bretton Woods System dating from the end of World War II), in which central banks in every country sold and bought U.S. dollars so as to keep exchange rates at a fixed level except for occasional abrupt devaluations usually preceded by crises. The U.S. dollar, in turn, was pegged to gold. Today, with some exceptions, the system is one of flexible or floating exchange rates, in which the rates are determined by market conditions of supply and demand. Frequent intervention by central banks sometimes results in what has aptly been called "dirty floating."

While there is strong opinion — although far from consensus — about the benefits of floating exchange rates, their higher short run variability has prompted demand for foreign exchange futures and

options. Such demand, of course, comes from importers and exporters who buy and sell abroad at prices dominated by other currencies, and who will pay or receive foreign exchange at some time in the future. Demand, of course, is also created by investors who buy or sell bonds denominated in foreign currencies and by speculators who at times think they have superior information.

Futures and options trading in foreign exchange are longstanding. In 1972 the Chicago Mercantile Exchange started to operate the International Monetary Market (IMM), dealings in futures, and options were added in 1982. The active, organized market covers five major currencies: the British pound, the Italian lira, the Japanese yen, the Swiss franc and the West German mark.

Part 4
Benefits, Criticisms and Regulation of Futures Markets

Why Futures Markets Are Useful

The existence and the nature of benefits from futures markets in terms of gains in overall economic efficiency were presented in earlier sections of this paper. This section will summarize them and add a few comments.

The benefits of futures markets can be grouped into three major categories.

First, futures markets facilitate the smooth operation of transactions involving carrying over of inventories of the underlying commodity or asset (corn, Treasury bills, or French francs). Still more important, futures markets permit transactions across time that otherwise would be impossible by allowing those individuals with presumably superior information to exploit such information and, in doing so, modify the outcome of the markets in the direction of a better allocation of resources. The effect of such superior information about future events improves public welfare by shifting production from times of abundance to times of scarcity, and consumption from times of scarcity to times of abundance.

Second, futures markets provide insurance (hedging) possibilities that would otherwise be impossible or much more complicated and expensive. The gains in economic efficiency are in this case the same as the very well-known gains derived from all other types of insurance.

Third, highly organized and very liquid futures markets, through the posting of futures prices, provide producers and consumers with an estimate of general market expectation. This is certainly a valuable guideline even for producers and consumers who would never engage in futures trading.

Some Common Criticisms of Futures Trading

As mentioned in the Introduction, there is a general lack of understanding of futures markets and their role among the public at large and even among some of those called upon to make policy decisions affecting those markets, as well as an uneasy feeling about futures markets that has resulted in some explicit criticism. The general feeling of uneasiness stems from a lack of understanding.

Specific criticisms are usually centered around the basic argument that futures markets bring about instability in an otherwise stable environment. In particular, the argument goes, such markets presumably generate unnecessary and disturbingly abrupt fluctuations in spot prices. The most classic — and relatively recent — example of that belief is an act of Congress which, in 1958, abolished futures trading in onions (see earlier reference, page 15) on the ground that it destabilized current prices. The answer to such criticism is two-fold.

First, even though the existence of futures markets can magnify changes in current prices in the wake of news about the future, the truth is that, as a result, changes in prices at the time the announced events materialize will be smaller than would otherwise occur. In the case of the example concerning superior information on weather conditions, the existence of futures markets generated an adjustment mechanism through which prices in the first period (which otherwise would not have changed) fell. Yet as a result, in the second period, prices fell far less than they would have otherwise. The possibility of trading across time and the enhancement of that trading through the presence of well organized futures markets tends — on the average — to smooth out price fluctuations that would be much more violent if each period were isolated from its past and future.

Second, arguments about the influence of news and expectation of future prices on current price movement fail to recognize that in many cases those changes have a resource allocation effect that, while not attractive in itself, is necessary to avoid additional harm. This is true, of course, of events over which markets or governments have no control — sometimes called "acts of God" in insurance policies and legal documents. If the news materializes, then futures markets and the change in spot prices have at least initiated corrective action before the fact. If changes do not materialize, the adjustment in current prices was unwarranted and hindsight indicates that it would have been better not to have made the adjustment. But in this case, those who bet on the news lose if that news does not materialize — remember that it is by betting their money that they started the mechanism leading to changes in the current price. There is, then, considerable incentive for individuals not to be mistaken in their predictions. But predictions need to be made about variables that are unstable by nature and over which we have no

control. If forecasts turn out to be incorrect, then the door is open for anyone willing to try to improve them.

Critics of futures markets sometimes consider news about other types of upcoming events. Such news is, more often than not, related to rumors about changes in governmental policies — sometimes far more difficult to predict than natural disasters or weather cycles. News of this sort, if correct, brings about changes in current prices that — given the change in policy — make the best of the situation. In this case, as in the case of acts of God, it is also true that unwarranted rumors bring changes that retroactively can be seen as undesirable. But here, again, the market is trying to forecast its future in the best manner possible. The usual complaint by policy makers — that markets are duly sensitive or outright hysterical — can be easily answered by saying that the best way to eliminate such hypersensitivity is by eliminating many of the attempts at fine tuning by policy makers who introduce, among other things, contrived uncertainly that is unnecessary in the first place.

Regulation

The semi-public character of futures markets as institutions is enough to indicate that they are subject to a great many regulations. It is beyond the purpose and scope of this essay to enumerate the regulatory agencies (although some are mentioned earlier) and their rules. It is necessary, however, to indicate the general areas of their concern.

Regulations concerning futures markets can be roughly grouped into two categories (although in some cases the distinction is not clear-cut): (1) those related to the reliability and seriousness of the transactions, the responsibility of members of the exchanges, and the prevention of fraud, and (2) those concerned with wider and more general issues.

Generally, the first group of regulations is the natural outcome of the need for establishing a climate of confidence among participants and would-be participants in the market. It could be argued that — left to completely unregulated private competition — the market would weed out those exchanges in which minimum guarantees are not present. After all, most exchanges started as business associations of a strictly private nature. It is also true, though, that the long process of building and maintaining a reputation can be speeded up and helped through some outside (governmental) supervision, if such supervision is done correctly.

The second type of regulation, aimed at much more general and less clearly defined issues, is not as easy to evaluate. Some of its rules — probably most of them — have the same objectives as certain regulations concerning spot markets. An example is the case of rules trying to prevent and/or punish monopoly behavior. Whether or not monopolistic

behavior exists is sometimes a relative concept. Monopoly exists whenever an individual (or a group of individuals who coordinate their actions) for reasons of the operation's large size can influence prices in a significant way. Whether or not size will generate monopoly power depends on its proportion in respect to the rest of the market. Thin markets (those in which the volume of operations is not very large) are, therefore, much more susceptible to monopoly influences. This is not a major problem in most U.S. futures markets. There is, also, a relevant distinction between transitory monopoly situations due to exceptional events such as an unexpected disruption that would leave one or few participants holding a large portion of certain contracts, and structural monopolies, which would be permanent if they are allowed to operate. Concerning the latter, participation by foreign governments has been a constant preoccupation of the exchanges, particularly in the case of commodities futures. Governments not only possess large financial resources, but also, in some cases, control the means to increase or decrease current supplies of particular commodities when their countries are the important, and sometimes the only, world producers.

As in the case of spot markets, to prevent monopoly formation is to preserve competition. That is a legitimate reason for regulation, provided regulation distinguishes between size as a requirement for efficiency and size used solely for the purpose of manipulating prices.

In general, other types of regulations aim at the frequently repeated basic objective of assuring "orderly market conditions" — an expression that is seldom defined. Among disorderly market conditions destabilizing manipulations, the spreading of false rumors, and the use of inside information are often cited as major evils to be prevented. These are, of course, also concerns in the case of spot markets.

Destabilizing manipulations and the spreading of false rumors can ultimately be linked to the problem of monopoly. Destabilizing manipulations, aimed at an initial change in a price as an inducement to the rest of the market to follow with the purpose of later engaging in opposite operations, can be pursued only if enough assets are under the control of the individual or group undertaking the endeavor. The spreading of false rumors in a market with many participants is easy only for those who are in a monopoly position concerning the sources of information. Rumors do not spread rapidly if there are ways such rumors can be double-checked. Confirmation of rumors is impossible only when there is no access to information except through those spreading the rumors.

The use of inside information by corporate officials and others who by virtue of their professional activities can have access to news well before the news becomes public is probably the most common market scandal in terms of both spot and futures markets. The typical story, especially in recent years, has involved the use of inside information

about forthcoming mergers of two or more corporations, which generally brings about important changes in the price of their shares. Immoral as such actions seem (and in many cases are), such dealings primarily have just distributive effects — that is, transfers of wealth from the rest of the market to those who use the inside information — rather than important effects on overall efficiency. The only efficiency loss is the eventual discouraging of individuals to join a market in which some may not play by the rules. Indeed, the case can be made that under some circumstances, given the certainty of a forthcoming change and in the absence of public disclosure of the news, market transactions by insiders are better than no transactions at all in that market movements may signal a forthcoming event. Of course, the individual or group possessing inside information will behave as a monopolist, and as is the case of most monopolists, they will not bring about the optimal competitive outcome. Still, such trading will influence prices in the correct direction for the same reasons set forth in Part 2, when individuals with superior knowledge about future weather conditions were able, through their actions, to modify the outcome of the market in a direction that increased overall efficiency.

In conclusion, the nature of the problems regulation tries to solve in the case of futures markets (namely, the preservation of truly competitive conditions) is not much different than in all other markets in the economy. Here, once more, the analogy presented at the beginning of this paper between transactions across time and transactions across locations does apply, and the valid reasons that might warrant regulation are essentially the same in both cases. In each of them, the central question is how to limit regulation to its strict necessary maximum, so that any distortions are eliminated while preserving the benefit of private competitive conditions.

References

Even a brief listing of the available references on futures markets is impossible within the confines of this short essay. Among many excellent references, readers may want to consult the following:

A Treatise on Markets by Joseph M. Burns (American Enterprise Institute, 1979) is an excellent short account of the purposes and benefits of futures markets.

Speculative Markets by Sarkis J. Khoury (Macmillan, 1984) is a very detailed and useful reference.

Interest Rate Futures by Robert W. Kolb (Robert F. Dame Inc., 1982), although dealing specifically with interest rate futures, is a good introduction to some of the intricacies of bonds, bonds futures, and options operations.

Two other sources may be helpful. First, the *Educational Edition*, published yearly by *The Wall Street Journal*, is a short and handy account of both the different kinds of futures markets and the manner in which quotations published in the *Journal* are to be interpreted. Second, large brokerage houses and the exchanges (such as the Chicago Board of Trade and the New York Stock Exchange) are more than generous in providing various elementary-leval pamphlets.

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The American free enterprise system traditionally rests on three premises: the right of ownership, contractual freedom and limited government. These premises generate predictable human behavior, consistent with liberty and efficiency. Indeed, the American free enterprise system produces a standard of living and a degree of personal freedom that no other system (or country) has been able to duplicate.

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